ABSTRACT

The Effects of Endurance Training and Short-term High Intensity Sprint Training on Performance and Endurance Related Variables in Well-trained Endurance Cyclists

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Background: Recent research has suggested supramaximal training can be an effective means of improving endurance performance; however ultra high intensity training (UHIT) has not been examined as a replacement of training volume in a well-trained endurance population. Overuse-related injuries, recurring illness, feelings of staleness, and overtraining that are often associated with high volume training may be avoided with low volume, UHIT training. **Purpose:** The purpose of this study was to compare the effects of two weeks of low volume UHIT with two weeks of traditional HV endurance training on lactate threshold (LT), VO_2max, steady state efficiency, substrate utilization rates, and 25K time trial performance in well-trained endurance athletes. **Method:** Twenty (VO_2max $\geq$ 55 ml/kg/min or 4.5 L/min and minimum training volume of 150 km/week) male cyclists were match-paired into two groups. Four two-day testing sessions were performed at 0, 2, 4, and 6 wks. Day one of testing measured VO_2max and lactate threshold. Day two involved a 10-min steady state ride followed by a 25K time trial. All participants were tested, then continued two weeks of their endurance training. Following a retest, the controls (CON) continued with their endurance training while the other half (INT) replaced their endurance training with UHIT, consisting of a 10-min warm-up followed by 8-10 x 30 sec sprints at a workload of 0.075 kg/kg body weight and 4.5 min recovery. Participants completed 6 training sessions over two weeks with two optional low intensity endurance days. Following the second phase all participants re-tested then either continued with (CON) or returned to (INT) their individual endurance-training regimen. A final testing session was conducted two wks later. **Results:** There were no significant differences between the two groups in VO2max or LT (% of VO2max).

GROUP	VARIABLE	Wk 1	Wk 2	Wk 3	Wk 4
CON	VO2max	4.12 ± 0.37	4.22 ± 0.46	4.25 ± 0.46	4.16 ± 0.40
	LT %	72 ± 9	71 ± 6	71 ± 9	71 ± 10
INT	VO2max	4.17 ± 0.49	4.23 ± 0.47	4.16 ± 0.43	4.09 ± 0.39
	LT %	69 ± 7	69 ± 5	69 ± 5	69 ± 5

In addition, cycling efficiency, steady state VO_2 and heart rate, and 25K time trial performance were not different. **Discussion:** A short-term reduction in training volume replaced by relatively short sessions of supramaximal training can affectively maintain endurance cycling performance for well-trained cyclists. This type of training may be useful as a means of decreasing the occurrence of negative consequences of long-term, high volume training.